Modular Active Power Filter Enersine ESD34

- Modular design, easy to extend
- Up to 51st harmonic
- Up to 12 harmonic orders selective individually
- Close/Open Loop Control
- Programmable power factor correction
- Full-time DSP Control system
- Easy selection
- Shunt connection, easy for maintenance
- Flexible Up-grading/Redundancy
- Parallel operated in different capacity
- User-friendly control panel

Energizing Your Sinewave

Enersine™

Active Power Filter

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Harmonics Pollution

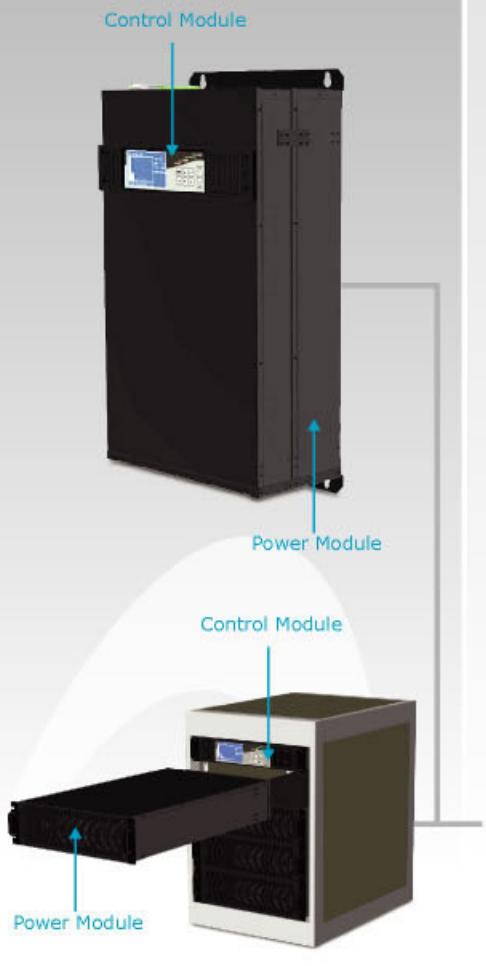
Harmonics Pollution is an increasing problem which affects all power distribution networks in industrial, commercial, telecom and medical applications. Most of power converting equipment or facilities can generate harmonics current:

- Uninterruptible Power System (UPS)
- DC power system/chargers
- Frequency converters
- AC/DC variable speed drivers
- Fluorescent lamps
- Welding machines
- Computers and peripherals

The True Harmonics Solution

Enersine is a solid-State power converter that brings about the following advantages to prevent possible power quality:

- Eliminate all harmonics currents from non-linear loads
- Compensate reactive power factor of lagging loads
- Act as a virtual damping resistor to prevent possible harmonic resonance



Effects of harmonics pollution

The utility fundamental frequency waveform is either 50 or 60Hz. Harmonics are impure components with higher frequency order than that of the fundamental. For example, the 5th harmonics order is 250Hz. 5 times that of the 50Hz fundamental waveform. These impurities pollute the voltage/current waveform and deteriorate the power effectiveness of an equipment or system. Such deterioration will further lead to the following effects:

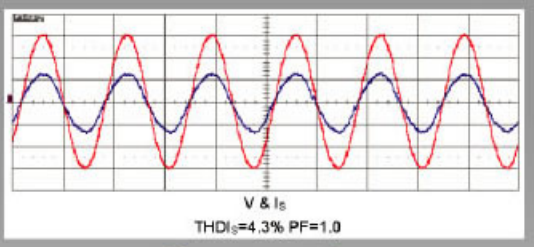
- Over voltage/current in the distribution network
- Over heated power cables due to skin effect and copper and iron loss in transformers, motors and generators
- Overheating in all types of electronics systems
- Causing component failures
- Nuisance tripping in circuit breakers and protection relays
- Malfunction of automatic control systems
- Damage to capacitors due to resonance
- Inaccuracy of instrument measurement
- Interference in telecommunication systems
- Voltage distortion and lagging in power factor

Modular and easy to extend

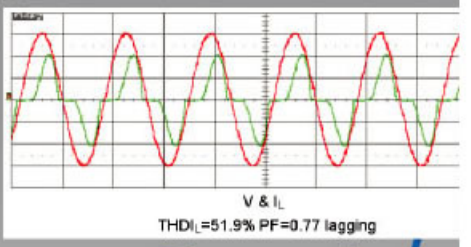
Designed in standard 19" rack mounting and wall mounting configuration. Composed of one Control Module plus several Power Modules(up to 4 units).

Power Factor Correction

Enersine not only compensate harmonic current but also the reactive power. It is able to correct for either a leading or lagging power factor.



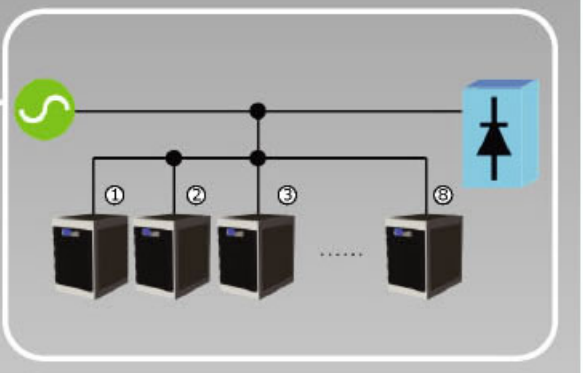
After compensation



Before compensation

Flexible up-grading/redundancy

In the event if the real value of the I_{Lh} is higher than the estimated one, or the I_{Lh} increase due to additional loads being added, there is no overload risk on the existing system which have been selected. Enersine has current limit capability up to its full rating, thus it will not shut down or malfunction but will continue to operate in full compensating mode. Additional It can be added in parallel on site later to meet the increment of the I_{Lh} value. The maximum parallel operation configuration is up to 8 control modules and different capacity can be operated in parallel.

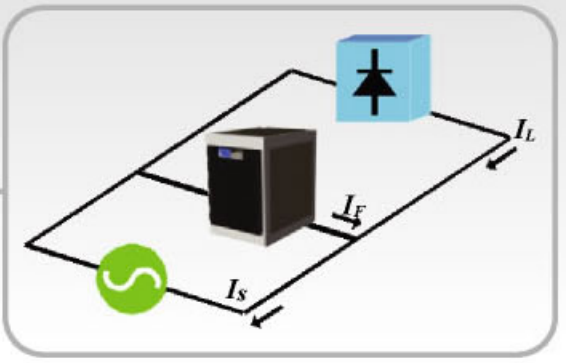


Easy Selection

There is no need to measure the impedance of the power system or analyze the load harmonics spectrum and their individual amplitude. The selection is based on the known estimated load harmonics current amplitude (I_{Lh}) to be compensated, then select the Enersine model which has the output compensating current rating greater than that of the I_{Lh}. Generally as a thumb of rule, we recommend a 25% higher rating than the I_{Lh} to be compensated. For example, if the known load harmonics current amplitude is 48 Amps, the appropriate rating of the Enersine should be 60 Amps.

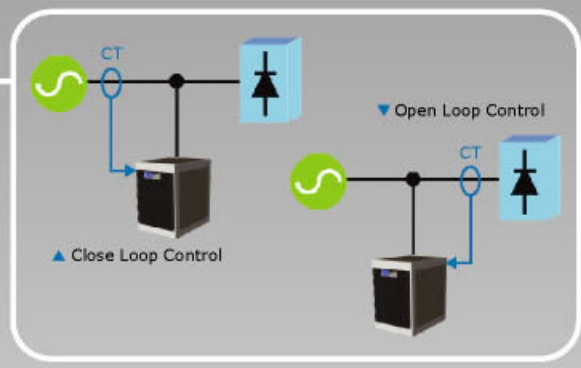
Energizing Your Sinewave

Enersine behaves like a harmonics current generator. It will measure the harmonics generated from the non-linear loads and cancel these harmonics with a newly generated, opposite phase shifted harmonics current of the same amplitude.



Close/Open Loop Control

The CT is allowed to install at source or load side for measure the harmonic current from the load. When CT is installed at source side, the close loop control method is used for best accuracy of harmonic current compensation.

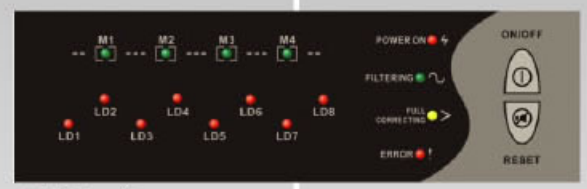


User-Friendly control panel

Enersine is equipped with a user friendly control panel. It is simple to turn the unit on or off and features buzzer silence and system status.

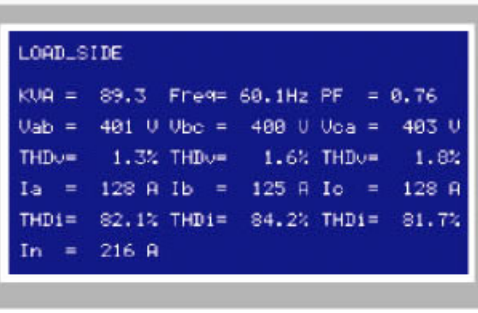
The optional LCD panel with special blue back light offers access to all parameters, waveforms, & spectrum for management of both Enersine and system power quality. The graphic LCD display & control panel gives easy access for load, source:

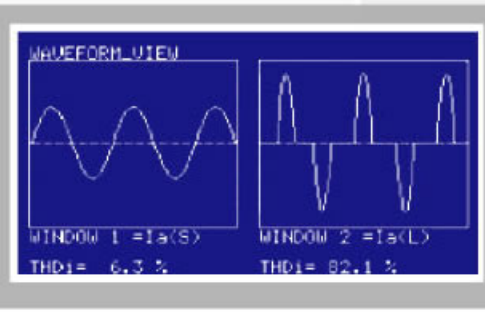
- Complete with V, I, F, PF, KVA, THD parameters
- Waveform & harmonic spectrum
- settings
- Status & alarms
- Events log
- Multi-language



▲ LED Panel

▲ LCD Panel Optional





Energizing Your Sinewave

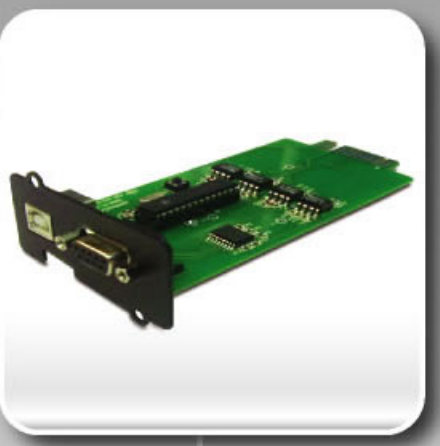
Enersine™ Active Power Filter

Ablerex

Communication Capability

Enersine uses J-Bus/MOD Bus protocol and provides 2 communication slots for install below communication cards.

- Standard RS232/USB Card
- Optional RS422/RS485 Card
- Optional Ethernet Card



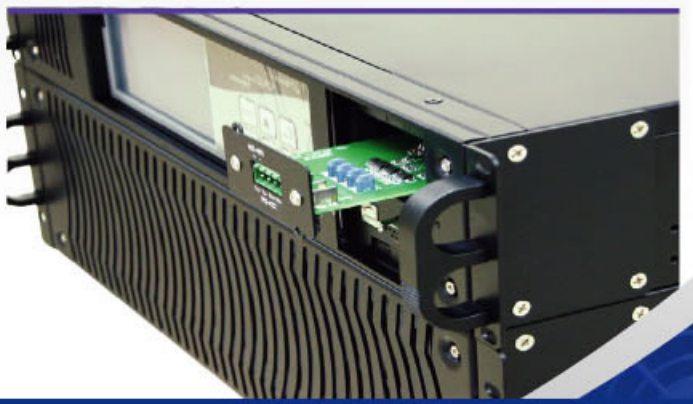
Dry Contact

5 output dry contacts for easy monitoring.
1 input dry contact for remote control.
EPO switch for emergency shutdown.

Optional Monitoring Software

ESD-Link34 has below functions for remote monitor and control.

- Real Time Monitoring
- Download the Parameter, Waveform, Spectrum and Event logs.
- Recorder for the Parameter
- Dry Contact programming
- Monitor up to 255 Units.



Modular Active Power Filter ESD34

General Characteristics

Storage Temperature	-20℃ ~ +70℃
Operating Temperature	+ 0℃ ~ +40℃
Relative Humidity	< 95%
Operating Altitude	<1000 m
Reference Harmonic Standard	EN 61000-3-4 , IEEE 519-1992
Reference Design Standard	EN60146

ESD34 - C R 035 - 400E - C

Control Panel Type
C: LCD Panel
E: LED Panel

Voltage Rating
400E : 400V
480A : 480V

Current Rating
030 : 30A
035 : 35A

Outlook Type
R : Rack Mount
W : Wall Mount

Module Type
C : Control Module
P : Power Module

Control Module Specification

Item \ Model Number	ESD34-C_035-400E-_	ESD34-C_035-480A-_
Input Voltage	400V +15%, -20%	480V +15%, -20%
Phase/Wires	3 phase 4 wires/3wires	
Frequency	50/60±3 Hz (Auto Sensing)	
Compensated Harmonic Orders	From 2nd to 51st order. Up to 12 orders actives simultaneously (2nd ~31st). Higher Order Compensation (32nd~51st) Disable / Enable operation.	
Power Factor Correction	Compensate both lagging and leading reactive power.	Compensate leading reactive power.
	Power factor can be programmed from 0.7 lagging to 0.7 leading	
CT Ratio	Can be set. Primary Current: 100A~10000A Secondary Current: 1A(Standard) / 5A (Optional)	
CT Location	Source or Load side	
Response Time	< 20 msec	
Controllable Power Module	ESD34-P_035-400E	ESD34-P_035-480A
Number of controllable Power Module	Up to 4 Power Modules.	
Parallel	Up to 8 Control Modules.	
Maximum Heat losses	50 Watt	
Color	RAL9011(PANTONE Process Black C)	
Protection Index	IP20	
Dimensions (WxDxH)	440 x 710 x 86mm	
Net Weight	5 Kg	

Power Module Specification

Item \ Model Number	ESD34-P_035-400E	ESD34-P_030-480A
Input Voltage	400V +15%,-20%	480V +15%,-20%
Phase/Wires	3 phase 4 wires/3wires	
Frequency	50/60±3 Hz	
Maximum Compensation Current/Phase	35 Arms	30 Arms
De-rating Compensation Current/Phase (1)	30 Arms	25 Arms
Maximum Compensation Current for Natural	105 Arms	90 Arms
Inrush Current	Less than rated current	
Current Limitation	Yes, at full correcting	
Maximum Heat losses	650 Watt	
Color	RAL9011(PANTONE Process Black C)	
Protection Index	IP20	
Dimension (WxDxH)	440 x 710 x 131mm	440 x 710 x 175mm
Net Weight	31 Kg	42 Kg

(1) When 2 and above Power Modules work in power scalable configuration, the power module will downgrade automatically from 35A to 30A. It means 60A/90A/120A, while 2/3/4 400V power modules connecting in parallel.

Communication Interface

Dry Contact (Standard Configuration)	a. 5 Output Dry Contacts. b. 1 Input Dry Contact c. 1 EPO
Communication Interface	Standard : RS232/USB Optional: RS485/RS422 Ethernet Card
Programming	Setting by expert service software or LCD control panel.
Monitoring Software (Optional)	***ESD-Link34***
Communication Protocol	J-Bus/MOD Bus Protocol

Control Panel

LED Control Panel	a.4 Status LED indicators: POWER ON, FILTERING, FULL CORRECTING and ERROR b.ON/OFF and RESET key pads c.4 Status LED indicators for Power Module. d.8 alarm LED indicators for Error Message
LCD Control & Display Panel (Optional)	a.4-status LED indicators: POWER ON, FILTERING, FULL CORRECTING and ERROR b.ON/OFF and RESET key pads. c.4 Directional Scrolling Keys/Enter Key/Escape key. d.LCD Display Panel offers following functions: • Meter: parameter, waveform and spectrum. • Event Log: Up to 300 records (FIFO). • Configuration: Compensation Setting, Compensation Logic Control and System Setting. • Multi-language Setting: up to 10 different languages

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